Hazardous Waste Management Commission Report

July through September 2011

Quarterly Report

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

A former gas station along Route 66 near Avilla, MO

Commissioners

Hazardous Waste Management Commissioners

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Michael R. Foresman
Charles "Eddie" Adams
Deron Sugg

"The goal of the Hazardous Waste Program is to protect human health and the environment from threats posed by hazardous waste."

For more information

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Past issues of the Hazardous Waste Management Commission Report are available online at dnr.mo.gov/env/hwp/quarerlyreport.htm

Missouri Department of Natural Resources
Hazardous Waste Program

September 2011 Program Update

We all remember the Schoolhouse Rock cartoon of how a bill becomes a law. Well, I do at least. Younger generations may not have been privileged enough to have their Saturday mornings peppered with the educational clips.

It's a simple enough question – how does a bill become law?

Our Budget and Planning Section tackles this very question in their part of this report. Every session, there are bills introduced that, directly or indirectly, affect the department and the Hazardous Waste Program. The program coordinates with the department's Director's Office to answer questions and send comments to the legislature.

Here's another simple question: how do you keep contamination in soil or groundwater from spreading? Actually, that's not a simple question. But it's one we deal with every day. At many sites we use engineered controls, which are essentially barriers at a site to keep the contamination in check. These barriers come in many different forms and Permits highlights some of these, including soil caps, groundwater extraction systems and subsurface venting systems.

There are a lot of underground storage tanks in Missouri. Thousands. And our Tanks Sections does a fantastic job keeping track of all of them. Problems, however, arise when we come across abandoned sites that don't have a responsible party. There's no one to clean it up, so these sites can sit vacant, sometimes for years or decades. The Tanks Section is always looking for funding opportunities to get these sites cleaned up. In their part of this report, the Tanks Section highlights some exciting grants they were recently awarded.

Coordination and communication are two key parts of the program. It's important to communicate with the public and the regulated community, but it's just as important to make sure we're talking with ourselves. To make sure the right hand and the left hand are on the same page. Which is why we hold regional office/central office workshops. Compliance and Enforcement discuss the recent workshop in their section of this report.

While on the subject of communication and coordination, this is probably a good enough place to mention the Hazardous Waste Forum. The forum met in July, our fifth meeting of 2011. Most of the day was spent discussing container management and packaging, marking and labeling requirements. The commission has heard many presentations on these issues, so I won't go into detail here, but will add that even though there are differences of opinion, most involved see the value of the Hazardous Waste Forum. There's nothing that says we have to hold these meetings and they often result in extra work for staff, but in order to have a meaningful Hazardous Waste Program we have to meet with those we regulate and those interested in hazardous waste.

Sincerely,

David J. Lamb

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How Bills Become Laws

Adapted from the Missouri House and Senate's websites explaining the lawmaking process: www.house.mo.gov/content.aspx?info=/info/howbill.htm; www.senate.mo.gov/bill-law.htm.

No law is passed except by bill. Bills may originate in either house and are designated as Senate Bills or House Bills, depending on the house in which they originate. Bills can normally be introduced until the 60th legislative day of the session.

The General Assembly convenes for the legislative session on Jan. 4, 2012

Pre-filing of bills begins December 1. Pre-filed bills are introduced on the first day of session. When introduced, a bill is read for the first time by its title and number. It then goes on the calendar for second reading and assignment to committee by the speaker of the House or the president pro tem of the Senate.

A public hearing before the committee to which a bill is assigned is the next step in the legislative process. When hearings are concluded, the committee meets to vote and makes its recommendations.

If a bill is reported favorably out of committee or a substitute is recommended it is placed on the "perfection calendar." When its turn comes up for consideration it is debated on the floor of the originating house. Further amendments can be proposed and are designated as House or Senate amendments. If perfected, the bill is reprinted in its original or amended form and is placed on the calendar for third reading and final passage. Approval of a constitutional majority of the elected members is required for final passage.

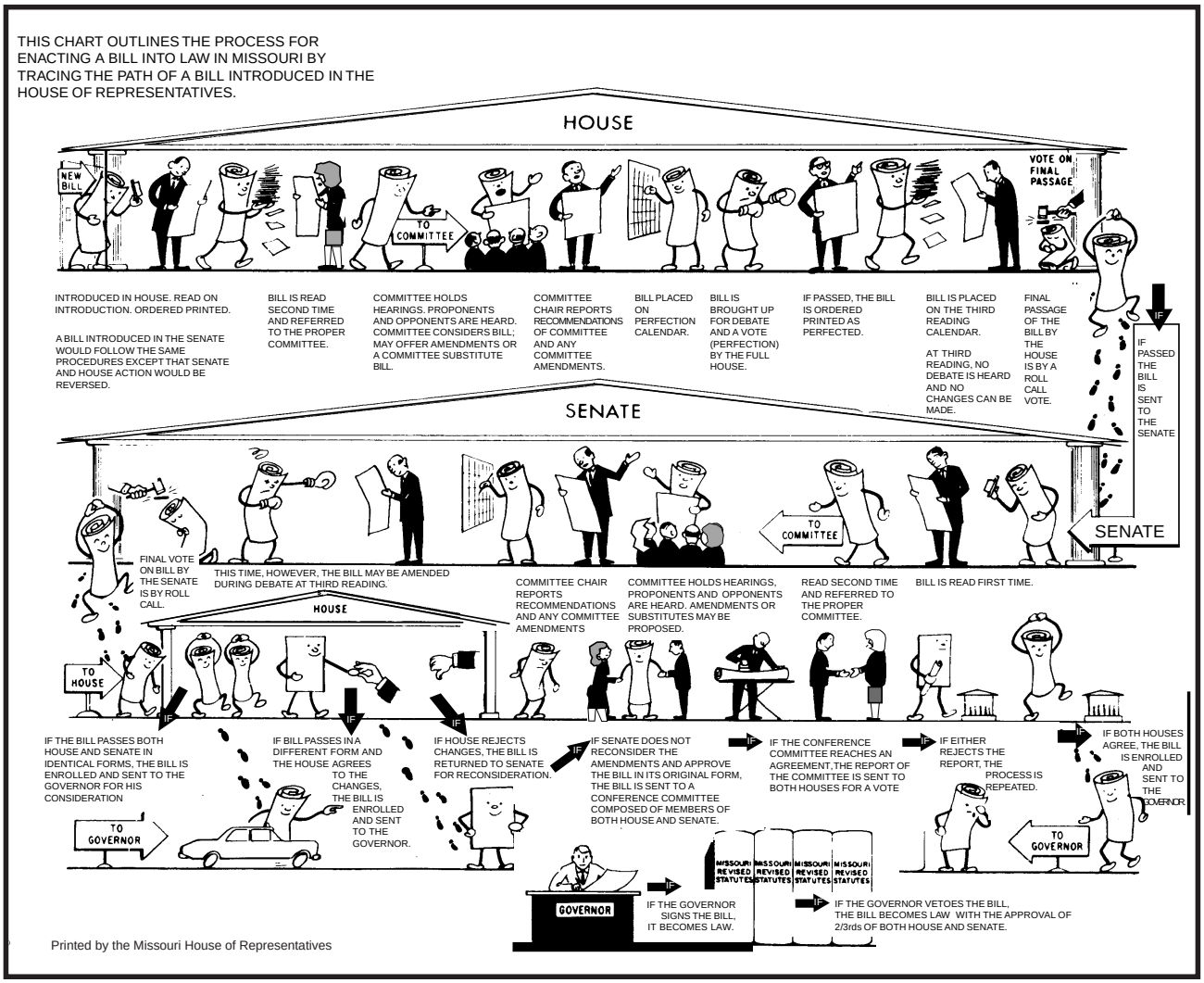
Passage of the bill is then reported to the other house where the process is repeated. After it is approved, the bill is declared "truly agreed to and finally passed" and ordered enrolled. Bills are signed in open session by the House speaker and Senate president or president pro tem.

The governor has 15 days to act on a bill if it is sent to him during the legislative session and 45 days if the legislature has adjourned or has recessed for a 30-day period. If signed or not acted upon by the governor, the bill will become law.

New laws are effective 90 days after the end of the session (August 28 for regular sessions). However, if a bill was passed with an emergency clause attached, it takes effect immediately upon the governor's signature. In addition, some bills specify the exact date when they are to take effect.

Missouri Department of Natural Resources - Hazardous Waste Program
Budget and Planning Section

The legislative procedure is virtually the same in both houses. The following illustration depicts the path a bill follows when introduced in the House.



The Missouri Department of Natural Resources issued certificates of completion for five Brownfields/ Voluntary Cleanup Program sites during July to September. Brownfields are real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.

Through the Brownfields/Voluntary Cleanup Program, private parties agree to clean up a contaminated site and are offered some protection from future state and federal enforcement action at the site in the form of a "No Further Action" letter or "Certificate of Completion" from the state.

QuikTrip 222 (former Georges Imports) - Kansas City

The Missouri Department of Natural Resources' Brownfields/Voluntary Cleanup Program issued a Certificate of Completion for the QuikTrip 222 (former Georges Imports) site located at 8011 State Line Road in Kansas City. This is the location of a former auto dealership with service bays, which contained hydraulic lifts on a 1.6-acre site. QuikTrip enrolled the site in the Brownfields Program to address contamination associated with the previous operations.

Initial investigations at the site indicated groundwater is contaminated with benzene and total petroleum hydrocarbons. Remediation will include the removal of 11 subgrade hydraulic fluid reservoirs. The department's Tanks Section issued a No Further Action letter in 1996 for the removal of several motor oil underground storage tanks and one transmission fluid underground storage tank. Therefore, this Certificate of Completion does not cover the underground storage tank removal overseen by the Tanks Section. Further, this letter does not cover the asbestos-containing material removal conducted on the former building prior to its demolition.

Twenty-seven hydraulic lifts were removed from the site in November 2010. A total of 1,775 tons of soil was excavated. Excavation continued until no obvious evidence of petroleum contamination remained or some obstruction prevented continued digging. Confirmatory samples were collected and soil samples from three locations exceeded Missouri Risk-Based Corrective Action default target levels.

The Tier 1 risk assessment indicated representative concentrations in soil and groundwater did not exceed residential target levels. No further site characterization and no restrictions for future site uses are necessary. The Certificate of Completition is for unrestricted use. The department determined the site is safe for its intended use.

The site will be redeveloped into a QuikTrip gas station and convenience store.

Trenton Municipal Utilities South Substation - Trenton

The Missouri Department of Natural Resources' Brownfields/Voluntary Cleanup Program issued a Certificate of Completion for the Trenton Municipal Utilities South Substation site located at 1st Street and Johnson Drive in Trenton. This site entered into the program to address contamination from a release of 9,000 gallons of diesel fuel. The site has been operated as an electrical distribution system substation since the 1970s. The fuel was spilled when the refueling equipment malfunctioned and continued to pump fuel from the bulk storage tank to the generator day tank, even though the day tank was full.

Emergency response efforts focused on excavating trenches in the vicinity of the fuel spill, disposing of contaminated sand, gravel and soil, and removing diesel product with a vacuum truck.

Following the emergency response phase, additional site investigations found petroleum hydrocarbons, especially diesel range, along with volatile and semi-volatile organic compounds in soil and groundwater above the lowest risk-based target levels, the default target levels, under the Missouri Risk-Based Corrective Action guidance. The extent of contamination was determined and a risk assessment was conducted that showed the contamination present is below the target levels for unrestricted use. The department determined the site is safe for its intended use.

The site will continue operating as an electrical distribution system substation.

Butler Hill Center – St. Louis

The Missouri Department of Natural Resources' Brownfields/Voluntary Cleanup Program issued a Certificate of Completion for the Butler Hill Center site located at 4333 Butler Hill Road in St. Louis. This is an approximately 10-acre site consisting of a shopping center, constructed in 1986-87. Businesses on-site include a Schnucks grocery store, dry cleaners, restaurant and various other retail shops and office space.

Phase I and II Environmental Site Assessments revealed petroleum-related contamination in the groundwater at levels that exceeded the Missouri Risk Based Corrective Action default target levels in a monitoring well near the southern property boundary. The contamination is suspected to have migrated onto the site from an adjacent leaking underground storage tank site. No contamination in soil was found to exceed risk based target levels or background levels and no contamination related to the dry cleaning business was found in soil or groundwater. Additional site characterizaton, risk assessment and groundwater monitoring were conducted. It was determined the contamination in the groundwater does not exceed applicable risk-based target levels and is stable or shrinking. The department determined the site is safe for its intended use.

The site will continue to operate as a shopping center.

International Foods Products Corp. - Expansion - St. Louis

The Missouri Department of Natural Resources' Brownfields/Voluntary Cleanup Program issued a Certificate of Completion for the International Foods Products Corp. - Expansion site located at 8125 Michigan in St. Louis. On the National Register of Historic Places, the Temtor building was designed in the early 1900s by noted architect Harry G. Clymer.

Named for its first tenant, the Temtor Fruits and Product Company, the building was later purchased by Coca-Cola® to manufacture the secret syrup supplied to bottlers in a five-state area.

Originally purchased by the adjacent International Foods as a facility expansion project, the site later changed owners and, through a $27 million renovation, is now being developed into approximately 28,000 square feet of retail space and 77 residential lofts.

The asbestos-containing material at the site was removed, with the exception of the crawl space beneath the first floor and the steam tunnel, which were encased by concrete. The lead-based paint was either removed and disposed or was encapsulated. An operations and maintenance plan is in place to manage the remaining asbestos-containing material and lead-based paint.

Eight underground storage tanks were removed from the northwest corner of the 8125 Michigan parcel. The removal and subsequent remediation were conducted under the oversight of the Tanks Section. The Tanks Section issued a No Further Action letter for the cleanup in May 2003. Consequently, this Certificate of Completion does not pertain to any contamination that may be remaining due to the former operation of these underground storage tanks. The department determined the site is safe for its intended use.

The Temtor project received $1.25 million in State Brownfields tax credits, $5.3 million in State Historic tax credits, $5.2 million in Federal Historic tax credits and $2.8 million in Tax Increment Financing. The first retail tenant to move in was Perennial Artisan Ales, a microbrewery.

Council Plaza Redevelopment Parcel 2 - St. Louis

The Missouri Department of Natural Resources' Brownfields/Voluntary Cleanup Program issued a Certificate of Completion for the Council Plaza Redevelopment Parcel 2 site located at 300 S. Grand in St. Louis. The 300 S. Grand address has been occupied by a variety of businesses, including the Teamsters Union Headquarters and has been referred to as Union Plaza. Other uses have included a truck sales and service business and a rifle range. Parcel 2 of the Council Plaza Redevelopment is the section of the property adjacent to Grand Avenue, where an investigation into soil contamination was required.

A Phase II Environmental Site Assessment was conducted to assess potential impacts to soil and groundwater. Groundwater was not encountered. Elevated levels of lead and polycyclic aromatic hydrocarbons were discovered in soil. Black material observed in soil borings was suspected to be petroleum hydrocarbons from the former truck sales and service facility. A work plan was approved to investigate and excavate soil. However, when soil was excavated, the black material was discovered to be part of a buried roadway, so soil was not removed. A risk assessment was conducted using soil data from the two sampling events, and it was determined the site meets residential standards. The department determined the site is safe for its intended use.

Completion of this project was aided by Brownfields Remediation Tax Credits from the Missouri Department of Economic Development. Council Plaza Redevelopment Part 2 is part of a larger development approved for up to $1.6 million in remediation tax credits. The redevelopment is now the Flats at 374, part of student housing for St. Louis University.

Council Plaza Redevelopment

Sites in Brownfields/Voluntary Cleanup

	Active	Completed	Total
JULY	264	630	894
AUGUST	268	631	899
SEPTEMBER	266	634	900

New Sites Received

July
- Gooch Brake (former), Kansas City

August
- Ehlers Property (former), Springfield
- Ferguson Fire Station, Ferguson
- Sunshine Electronic Display Corporation, St. Joseph
- AAA Office Building (former), St. Louis
- Cave Springs Crossing Shopping Center, St. Charles
- Lafayette Venture Redevelopment, St. Louis

September
- St. Mary`s Infirmary (former), St. Louis

Sites Closed

July
- QuikTrip 222 (former Georges Imports), Kansas City

August
- Trenton Municipal Utilities South Substation, Trenton

September
- International Foods Products Corp. - Expansion, St. Louis
- Council Plaza Redevelopment Parcel 2, St. Louis
- Butler Hill Center, St. Louis

Drycleaning Environmental Response Trust Fund

The department's Drycleaning Environmental Response Trust, or DERT, Fund provides funding for the investigation, assessment and cleanup of releases of chlorinated solvents from dry cleaning facilities. The two main sources of revenue for the fund are the dry cleaning facility annual registration surcharge and the quarterly solvent surcharge.

Registrations

The registration surcharges are due by April 1 of each calendar year for solvent used during the previous calendar year. The solvent surcharges are due 30 days after each quarterly reporting period.

Calendar Year 2010	Active Dry Cleaning Facilities	Facilities Paid	Facilities in Compliance
Jan. - March 2011	222	113	50.67%
April - June 2011	222	186	83.78%
July - Sept. 2011	222	202	90.99%

Calendar Year 2011	Active Solvent Suppliers	Facilities Paid	Suppliers in Compliance
Jan. - March 2011	11	10	90.91%
April - June 2011	11	11	100%
July - Sept. 2011	11		

Cleanup Oversight

Calendar Year 2011	Active	Completed	Total
Jan. - March 2011	23	9	32
April - June 2011	23	9	32
July - Sept. 2011	21	10	31

New Sites Received 0

New Sites Closed
September
Premier Dry Cleaners of KC, Kansas City

Reimbursement Claims

The applicant may submit a reimbursement claim after all work approved in the work plan is complete and the fund project manager has reviewed and approved the final completion report for that work. The fund applicant is liable for the first $25,000 of corrective action costs incurred.

	Received	Under Review	Paid/Processed
July	0	4	2
August	4	2	0
September	6	7	2

	Received	Under Review	Paid/Processed
July	$0.00	$62,958.14	$25,899.20
August	$73,717.84	$26,685.47	$0.00
September	$51,238.50	$95,931.60	$47,345.30

Reimbursement Claims Processed:

Fenton Plaza 48	Fenton	$26,736.71
First Capitol Cleaners	St. Charles	$20,608.59
Plaza Ford Ideal Laundry & Dry Cleaners Inc.	Kansas City	$5,283.00
Tri State Service Co. - E. Trafficway Site	Springfield	$20,616.20

Total reimbursements as of Sept. 30, 2011: $1,575,242.50
DERT Fund Balance as of Sept. 30, 2011: $1,605,380.96

Inspections and Assistance

Regional Office Hazardous Waste Compliance Efforts

- Conducted 103 hazardous waste generator compliance inspections:
  - 12 at large quantity generators.
  - 53 at small quantity generators.
  - 30 at conditionally exempt small quantity generators.
  - Six at E-waste recycling facilities.
  - Two at resource recovery facilities.
- Issued 49 letters of warning and two notices of violation requiring actions to correct violations cited during the 103 inspections conducted.
- Received and investigated 56 citizen concerns regarding hazardous waste.

Hazardous Waste Compliance and Enforcement Efforts

- Conducted 13 inspections of commercial hazardous waste treatment/storage/disposal facilities, none of which resulted in the issuance of a notice of violation.
- Conducted two focused compliance inspections.
- Issued three penalty negotiation letters.
- Worked with the Attorney General's Office to prepare one settlement agreement.
- Resolved and closed two hazardous waste enforcement cases.
- Received eight new enforcement cases and issued two letters of intent to initiate enforcement action.

Tanks Compliance and Enforcement Unit

- The Tanks Compliance and Enforcement Unit has worked with the regulated community, the Missouri Petroleum Storage Tank Insurance Fund and the Missouri Petroleum Marketers and Convenience Store Association to draft rule changes pertaining to the operational aspects of underground storage tanks. With the rapid development of new equipment in recent years, this effort is geared toward updating the underground storage tank regulations to better align with the industry of today and help prevent future releases. These changes also include expanded oversight authority for new installations, required closure for all out of use tank systems, better assessments for steel tanks to remain in use, more detailed reporting of underground storage tank system tests and evaluations and clarification of vague or ambiguous language. They have now been approved by the Joint Committee on Administrative Rules and are slated to go into effect Jan. 1, 2012.
- To further promote the new regulations, the department's Heather Peters made presentations at the National Institute for Storage Tank Management and the St. Louis Oil Man's Club luncheon on Oct. 17, 2011. This outreach will help spread the facts about regulation changes and promote the department's willingness to ensure the tanks regulated community is aware of things to come.
- The National Tanks Conference, held every 18 months, will be hosted in St. Louis in March 2012. This national conference is the premier underground storage tanks conference for which all aspects of compliance, remediation and management are presented and discussed. This will be a great opportunity for department staff who work with underground storage tanks to meet with key individuals from the other states and the Environmental Protection Agency, as well as those within the industry.

Missouri Department of Natural Resources - Hazardous Waste Program
Compliance and Enforcement Section

- Because of the hard work put forth in learning and applying effective release detection methods for underground storage tank systems, the Tanks Compliance and Enforcement Unit is proud to acknowledge that Heather Peters, an Environmental Specialist IV, has been invited to become a member of the National Workgroup on Leak Detection Evaluations. Heather has already attended her first meeting as a member and is looking forward to the new challenges it will bring.
- The Missouri Legislature recently passed a bill that initiates action by the Petroleum Storage Tank Insurance Fund for underground storage tank operator training. A member of the Tanks Compliance and Enforcement Unit will be serving as the liaison with the fund on this project, with staff from Tanks Compliance and Enforcement Unit, the Tanks Section and other department sections providing input and support.
- The department began inspecting every new tank installation in 2009. Not only has this effort been very successful in confirming and documenting the equipment installed, but has made great strides in ensuring installations are conducted in accordance with manufacturer requirements and industry standards.
- In addition to compliance and operational issues, the unit continues to use the expedited referral process previously approved by the Hazardous Waste Management Commission. The dedicated efforts of those involved with this procedure have reduced the number of facilities without a documented financial responsibility mechanism.
- During July through September 2011, the Tanks Section referred 19 facilities with financial responsibility violations to the unit for enforcement action. Tanks Compliance and Enforcement Unit staff resolved 18 enforcement cases, 15 of which had financial responsibility violations. The unit also referred three facilities to the Attorney General's Office for enforcement action, all of which had a financial responsibility violation.

Polychlorinated Biphenyl Inspector

The inspector conducted 31 compliance inspections at various types of facilities throughout the state. The reports are forwarded to the U.S. Environmental Protection Agency Region 7, which has authority for taking any necessary enforcement action regarding PCBs according to the Toxic Substances Control Act.

Hazardous Waste Transporter Inspector

The inspector conducted 30 commercial vehicle inspections, during which five vehicles were placed out of service. As part of the Commercial Vehicle Safety Association's protocol, the department sends the reports to the Missouri State Highway Patrol. The transporter must certify to the patrol the violations were corrected.

The inspector also inspected three commercial transporter facilities during this quarter. The inspector is currently working to resolve unsatisfactory issues with two of these facilities.

The inspector sent 69 letters to inactive, unregistered or conditionally exempt small quantity generators that shipped small quantity or large quantity amounts of hazardous waste. These facilities are required to register with the department.

As of September 30, there were 216 licensed hazardous waste transporters in Missouri.

Regional Office/Central Office Hazardous Waste Workshop

On Sept. 20 through 21, 2011, the Regional Office/Central Office Hazardous Waste Workshop was held in Rolla. Representatives from the regional offices and the Hazardous Waste Program attended to discuss current compliance and enforcement issues and topics. Presentations included updates and revisions to the hazardous waste portion of the Operations Manual, generator registration, inspection checklists and accompanying handler evaluation logs, and highlights of the past year presented by regional office representatives. A highlight of the workshop was a *What Makes a Good Criminal Case* presentation by Kenneth Jamison of the U.S. Environmental Protection Agency's Criminal Investigation Division. This workshop is very beneficial in that it allows central office and regional office staff to meet and discuss issues and situations they encounter during the course of their work and also to discuss and garner input about procedural and policy issues.

Engineering Controls to Protect Human Health and the Environment at Hazardous Waste Remediation Sites

Protecting human health and the environment is the department's main mission at any hazardous waste treatment, storage or disposal facility, but even more so at facilities where hazardous wastes or hazardous waste constituents have been released to the environment. These releases can contaminate several different media at the site, such as soil, groundwater and surface water. Soil and groundwater at sites are often affected where the contamination has been released over a long period. However, surface water can also be affected if rain or other surface water flows over the contaminated soil and carries the contamination to streams, rivers and lakes or contaminated groundwater is received by a stream, river or lake through a pathway such as a spring.

In addition to performing site remediation, also known as corrective action or cleanup activities, these facilities must prevent humans, animals, habitats and other "receptors" from being exposed to the contamination at levels that may cause unacceptable risks to human health or the environment or injury to natural resources. The facility and the department work together to determine what type of contaminants were released at the site and where the contamination is located. The Permits Section uses that information to determine possible pathways, such as air, soil, water and food, humans and the environment could be exposed to the contamination. The section evaluates possible ways to prevent the receptors from being exposed to the contamination through those pathways. In addition to site remediation, this is often accomplished by using engineered and institutional controls.

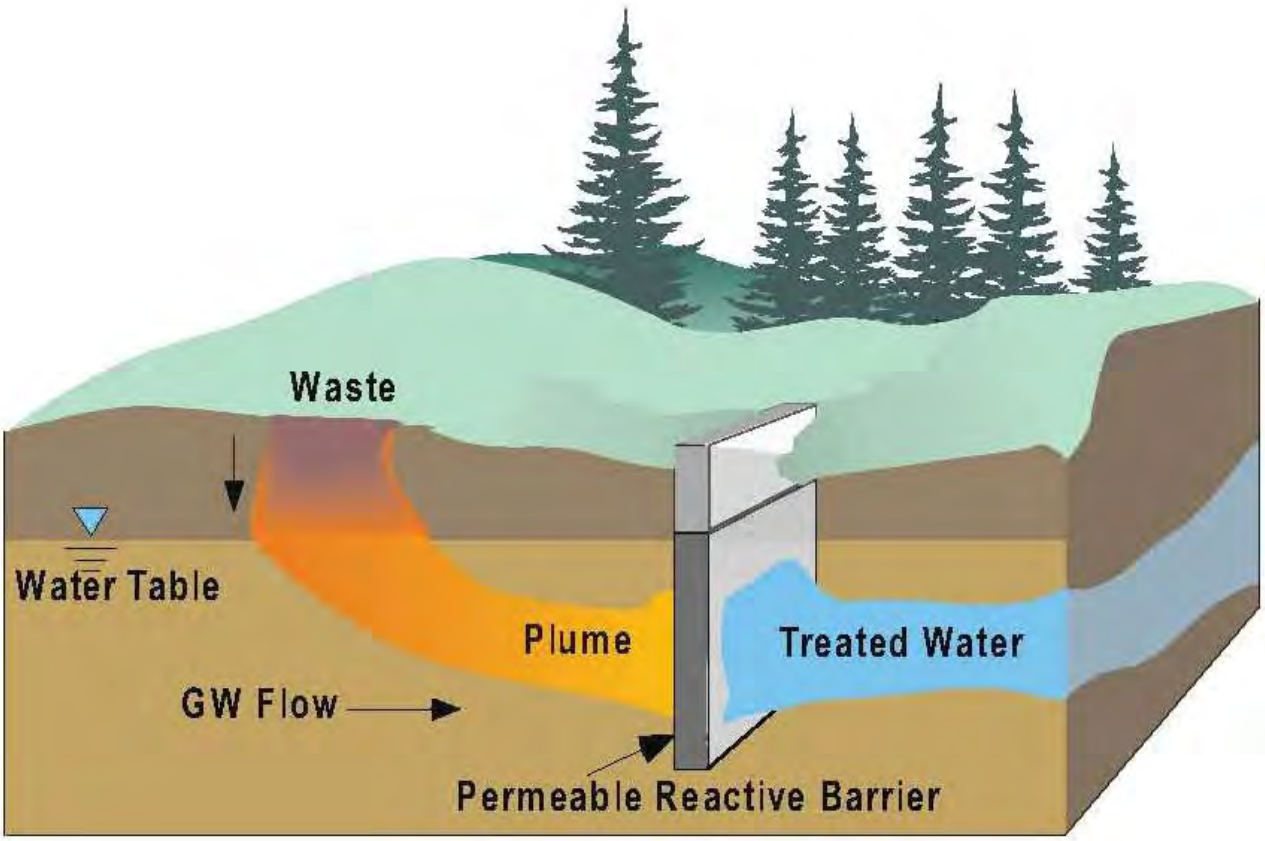
Engineered controls contain or otherwise limit the spread of the contamination by physically changing the site to place a barrier between the contamination and the potential receptor, thus limiting exposure pathways. In most cases, engineered controls are used for soil and groundwater contamination. Engineered controls may also be needed to prevent contaminated soil or groundwater from spreading to or further affecting surface water bodies.

Engineered Controls for Contaminated Soil

1. Cap

A cap is a horizontal physical barrier built over the contaminated soil to prevent receptors from being exposed to the hazardous wastes and hazardous waste constituents. Caps are also used to prevent rain from soaking into the contaminated soil and leaching, or carrying, the hazardous wastes and hazardous waste constituents to the groundwater. Caps at Missouri hazardous waste sites are built according to certain technical standards specified by the department, such as using a water-resistant clay layer or flexible synthetic membrane covered with vegetated topsoil, asphalt or concrete. The cap's design is influenced by many factors, including the potential for the cap and any fill beneath to settle, water drainage above and below the cap and the management of any gases produced under the cap.

An example of a cap is located at EaglePicher Technologies, LLC, in Joplin. From 1989 to 1990, EaglePicher closed its surface impoundment, which received wastewaters from manufacturing processes. The contaminants released from the impoundment over its lifetime were metals including lead, mercury, arsenic and cadmium. The project area included about 2.5 acres. Since it was impractical to completely remove all contamination, a clay cap was built over the former surface impoundment to prevent rainfall from leaching the contamination deeper into the soil. Twenty-four inches of compacted clay was placed over unclassified fill and topped with six inches of topsoil and seed. The area was fenced and is routinely checked for damage to the topsoil and clay layer by erosion or animals.



An example of an engineered control.

2. Vertical Engineered Barriers
Vertical engineered barriers, also called subsurface engineered barriers, are physical structures built around contaminated soil to prevent receptors from potential exposure to the hazardous wastes and hazardous waste constituents. They are also used to prevent the spread of hazardous wastes and hazardous waste constituents by treating contaminated groundwater or keeping the groundwater from coming into contact with the contaminated soil. Examples of subsurface engineered barriers are slurry trenches, sheet-pile walls and permeable reactive barriers.

3. Stabilization and Solidification (Immobilization)
The stabilization process chemically changes the hazardous wastes and hazardous waste constituents into less harmful or less mobile compounds; however, other physical or chemical characteristics may or may not change. For example, applying cement or lime to soil contaminated by metals changes the metals into compounds that do not move as easily through the soil.

Solidification is the process of encapsulating the hazardous wastes and hazardous waste constituents in a solid material, preventing the chemicals from moving. Chemical bonding does not necessarily occur between the encapsulated compounds and the additives causing the solidification; however, the solid can be left in place or removed to another location. For example, cement mixed with contaminated soil results in a solid that can be transported after it dries.

4. Subsurface Venting Systems
Soil vapor extraction, also known as "soil venting" or "vacuum extraction," removes vapors released from contaminated soils or groundwater in the subsurface. These vapors can move through the soil and into a home or building through cracks or openings in the foundation slab or basement. In this process, either a vacuum can be applied to the contaminated soil through extraction wells or the

vapors can be vented from the soil through a series of pipes. The vapors are "sucked" through the soil pores toward the wells or piping designed to capture and remove them. After the vapors are captured, it may be treated and released to the atmosphere or simply vented to the atmosphere without treatment if allowed by local and state laws and regulations.

An example of a subsurface venting system is the sub-slab depressurization system at the former SECO Products Corp. facility, located in Washington, Missouri. The system consists of 12 separate runs of slotted piping placed in trenches about one foot below the floor slab of the former products building, in an area encompassing more than 90,000 square feet. The area corresponds with impacted groundwater beneath the building. The process removes vapor phase contaminants that include trichloroethene, 1,2-dichloroethene and vinyl chloride.

Engineered Controls for Contaminated Groundwater

1. Groundwater migration barriers

Groundwater migration barriers are subsurface vertical engineered barriers built around the contaminated groundwater to prevent receptors from being exposed to the hazardous wastes and hazardous waste constituents. Barriers are designed to prevent the contaminated groundwater from moving off the contaminated property, allowing the facility to contain or treat it in place. An example of a groundwater migration barrier is a permeable reactive barrier. These barriers are a little different in that instead of preventing the groundwater from moving, they are designed to allow the contaminated groundwater to flow through the barrier, treating the contaminants with reactive materials as it passes through with the water and exits on the other side.

2. Groundwater extraction systems

A groundwater extraction system controls contaminant movement in the groundwater by removing the groundwater and contaminants from the soil through wells, trenches or drains. As the groundwater is removed from the well, trench or drain, more groundwater and contaminants flow towards the well, trench or drain. After the groundwater is removed, it will often require treatment before being disposed. Groundwater extraction and treatment not only keeps contaminated groundwater from moving to and affecting neighboring properties, but also reduces the contaminant levels in the groundwater.

3. In-situ groundwater treatment systems

In-situ, or in place, groundwater treatment involves treating the contaminants without removing the groundwater from the soil. Organic contamination and occasionally metals and other inorganic contaminants can be destroyed or reduced through this type of treatment. There are several types of in-situ groundwater treatment processes, such as electrochemical methods or injecting chemicals into the contaminated groundwater at one location and removing it at another location. There are also biological methods such as injecting bacteria into the contaminated groundwater or phytoremediation, which uses certain plants to remove contaminants from shallow contaminated groundwater. This type of treatment is typically very specific to the type of contaminants and their location.

Protecting human health and the environment at a site where hazardous wastes or hazardous waste constituents have been released includes preventing receptors from being exposed to contaminants at levels that cause injury. Engineered controls not only physically protect receptors from coming into contact with the contamination, but can also reduce the contamination itself. There is no universal definition of engineered controls, and specific definitions may vary from one environmental agency to another. In general, engineered controls include any actions that physically change the site in order to contain or otherwise limit the movement of contamination in the environment.

Compass Plaza Trichloroethylene Site - Rogersville

The Compass Plaza Trichloroethylene, or TCE, site in Rogersville was included in the Sept. 16, 2011, *Federal Register* as one of 11 sites EPA plans to add to the Superfund National Priorities List. A 60-day public comment period about the proposed addition ended November 15.

The site is considered a contaminated groundwater plume. The source of the contamination is unknown. The department's Superfund Section initiated a combined preliminary assessment/site investigation and removal site evaluation on March 24, 2010. Thirteen of the 100 private wells sampled during the initial round showed detectable concentrations of TCE. Five drinking water wells within that sampling group had TCE concentrations above the maximum contaminant level of 5 parts per billion. The department requested EPA provide alternate water supply to the households drinking contaminated water.

Brief chronology of actions since initial sampling event:

Week of Aug. 16, 2010: EPA installed five water treatment systems in private residences with TCE concentrations above the maximum contaminant level. Analytical results of post treatment water samples indicate the systems are effective in removing TCE. Sampling to identify other impacted wells found one additional drinking water well with TCE, but the TCE concentration was below the maximum contaminant level.

Week of Oct. 4, 2010: EPA sampled 51 private drinking water wells. There were no detections of TCE in these samples.

Week of Dec. 13, 2010: EPA in cooperation with the department, Greene County Resource Management and the Natural Resource Conservation Service plugged a well with high concentrations of TCE to protect groundwater resources. These same agencies oversaw the construction of a new drinking water well. No TCE was detected in the new well. Also, during this week, 65 well water samples were collected from previously unsampled wells and wells where TCE was previously detected. One additional well was found to have TCE below the maximum contaminant level. This well is located in the same general area as wells previously found to have TCE contamination.

Week of Feb. 21, 2011: EPA sampled 25 wells. No new wells were found to have detectable concentrations of TCE.

Week of May 9, 2011: EPA sampled 45 private drinking water wells. No new detections of TCE were found in these samples. The EPA also collected 13 soil samples in an effort to identify a source for the TCE. No detections of TCE were found in these soil samples.

Investigating a well in Rogersville.

EPA plans to continue sampling private drinking water wells at no cost to the well owner. Treatment systems will be installed at no cost to the property owner in wells with concentrations of TCE above the maximum contaminant level. The department plans to conduct a comprehensive dye trace study to fill in data gaps in previous dye trace work conducted by Greene County. This dye trace work may help the department and EPA in determining possible source locations for the TCE.

To date, 1,652 sites across the nation have been listed on the National Priorities List. Of these sites, 350 sites have been cleaned up. There are 62 proposed sites awaiting final EPA action.

Taking soil samples in Rogersville.

With all National Priorities List sites, EPA works to identify companies or people responsible for the contamination at a site, and require them to conduct or pay for the cleanup. For the newly listed sites without viable potentially responsible parties, EPA will investigate the full extent of the contamination before starting significant cleanup at the site. Therefore, it may be several years before significant EPA clean up funding is required for these sites.

Oakland Heights – Kansas City

As part of the redevelopment of the Oakland Heights I rental houses, soil samples were collected from around the rental houses in February 2011. The soil was tested because lead-contaminated soil had previously been discovered in the surrounding area, including the Oakland Heights II townhomes, which were cleaned up in 1997.

Lead was found in the soil in amounts above what is considered safe for people, especially children under the age of six.

The Environmental Protection Agency's recommended cleanup level of lead for residential yards is 400 milligrams per kilogram, also known as parts per million. The average lead levels in soil collected from 160 samples around the Oakland Heights rental houses was 676 parts per million.

It is not known where the lead came from. The Missouri Department of Natural Resources started investigating the surrounding properties in early August.

A public meeting was held Tuesday, Sept. 13 near the Oakland Heights area. Superfund staff, the environmental contractor for the site and the Department of Health and Senior Services presented information about their involvement with the site. Additionally, free blood-lead tests were performed for anyone interested.

Cleanup Of Contaminated Soil

On June 10, 2011 the new owner of Oakland Heights I rental houses voluntarily entered into an agreement with the Department of Natural Resources to clean up the lead contaminated soil.

The department approved the cleanup plan and will be visiting Oakland Heights periodically to oversee cleanup activities. The Missouri Department of Health and Senior Services also reviewed the cleanup plan.

The cleanup will be conducted in two phases. Each phase will take about eight weeks to complete. The first phase began in fall 2011 and the second phase is planned for spring 2012.

All Oakland Heights I single family rental houses will have 12-inches of clean soil brought in to cover the yards. Some areas will have up to 12-inches of contaminated soil removed in addition to being covered with 12-inches of clean soil.

The cleanup of contaminated soil is being paid for by the site developer. Residents are not responsible to pay for any of the soil cleanup activities.

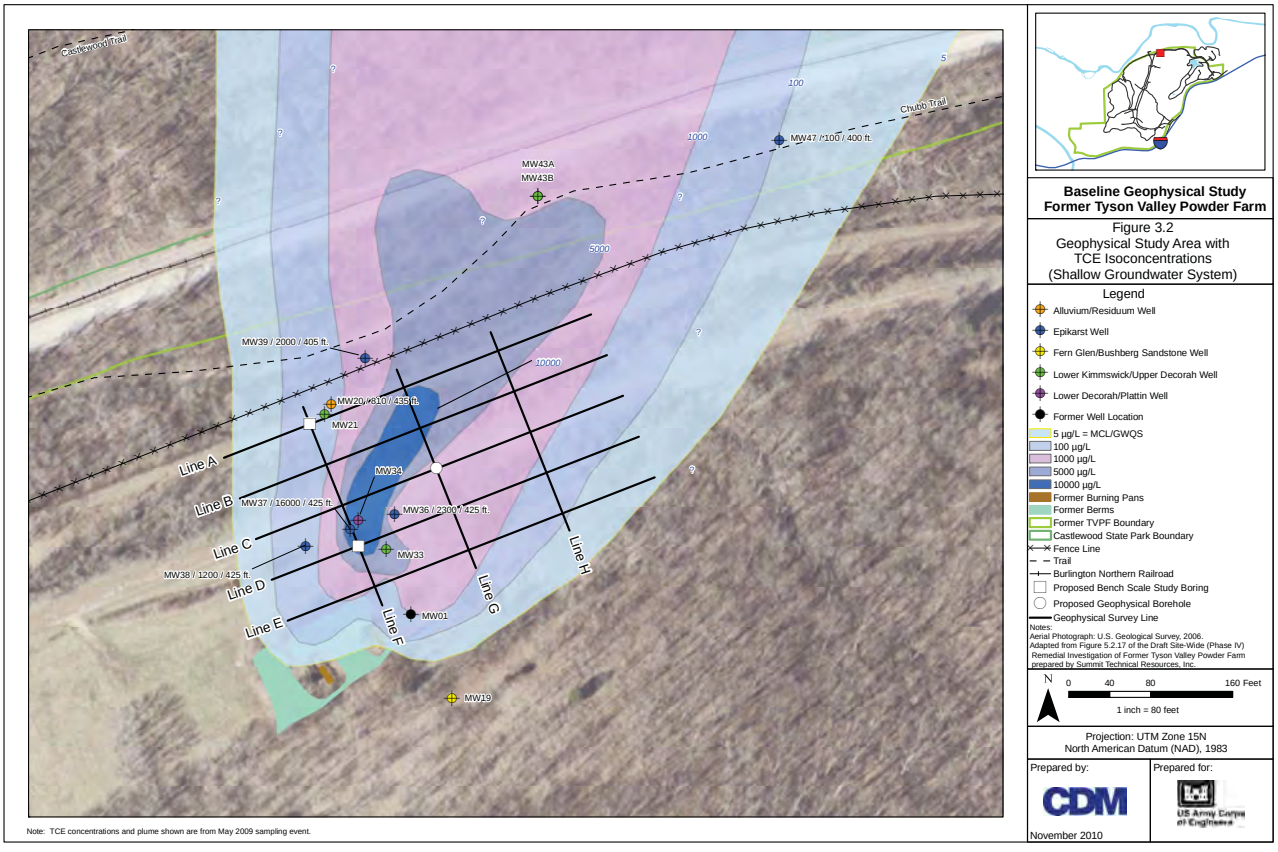
Tyson Valley Powder Farm Pilot Study

The U.S. Army Corps of Engineers, in coordination with the Hazardous Waste Program's Federal Facilities Section, is proposing a unique pilot study to look at an area at the Tyson Valley Powder Farm site, located near Eureka. The site, which has a long and rich history, is so named because small arms ammunition testing and storing of gunpowder occurred there during World War II. The pilot study will look at issues related to hazardous waste.

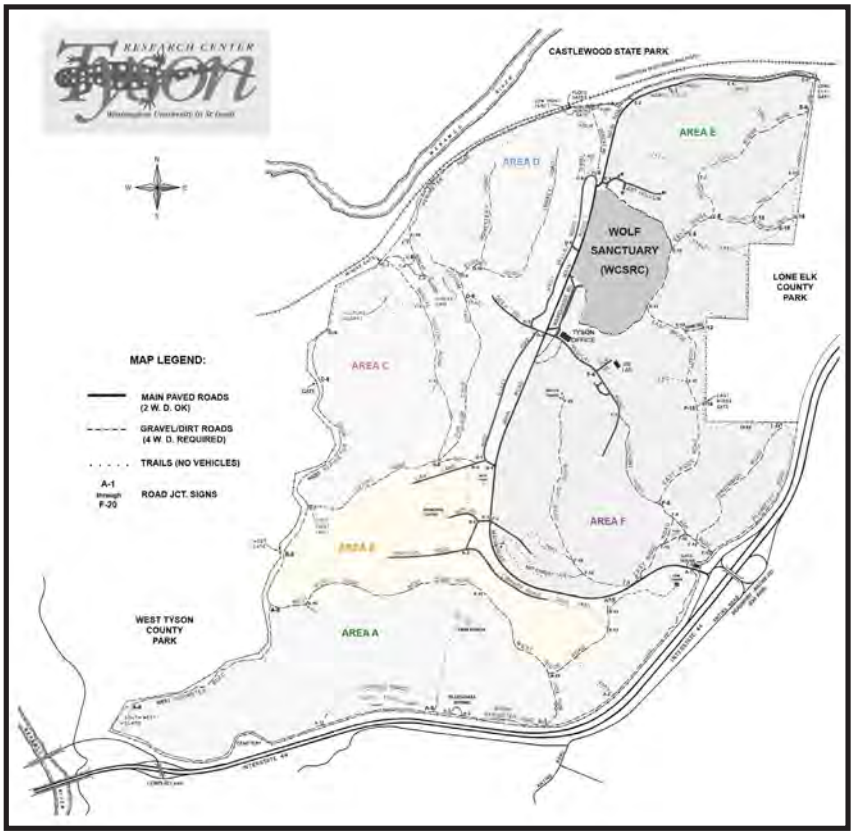
The Tyson Valley Powder Farm was originally a 2,620 acre facility. Currently 1,966 acres are owned by Washington University Tyson Research Center with 405 acres of the original facility being used as St. Louis County's Lone Elk Park and West Tyson County Park. Additional remaining acreage is under easements for Interstate 44 and the railroad.

The Tyson Valley Powder Farm was used primarily as a storage facility for the production of small arms ammunition from 1941 to 1947 and 1951 to 1961. A secondary use of the site was for munitions testing and disposal. Site observations show small arms waste, such as brass shell casings and fragments, as well as other miscellaneous scrap metal. Little historical information exists describing disposal practices. The U.S. Army Corps of Engineers has identified several areas of concern throughout the former Tyson Valley Powder Farm that require investigation and potential cleanup.

The Army Corps of Engineers is proposing a pilot study that will gather information about the geology, specifically for an area known as Area of Concern 2. This area is a former burning pan site. The site had two burning pans, each surrounded by 8-foot high earthen berms within an open field. The two burning pans were constructed of 3-inch steel plates approximately 12-feet long and 5-feet wide. Each burning pan was positioned approximately 1-foot above the ground surface. The burning pans were used by the military to burn gun powder that did not meet quality specifications. The burning pans and earthen



berms have since been removed. The primary source of contamination at Area of Concern 2 is trichloroethylene from containers, paint cans and possibly drums disposed in two pits within the former burning pan area. The pilot study is to evaluate possible remedial actions that will be reviewed in the feasibility study. This pilot study is to evaluate the geophysical area downgradient of the source area and to evaluate potential carbon sources and zero-valent iron. The objective of the study is to inject materials into the downgradient soil and groundwater biodegradation of the TCE and daughter products will occur over time. This study is still in the early phases and a great deal of information is being gathered.



Throughout the years, numerous studies and removals have been done at this site. In 2004, the U.S. Geological Survey used electromagnetic and magnetic methods to locate anomalies indicating relatively large concentrations of buried metallic debris within the selected areas of concern. This surface-geophysical investigation was performed to evaluate the areal and vertical extent of metallic debris in the subsurface within three of these areas of concern. The geophysical methods selected for this study were useful in determining the extent of metallic waste within the former Tyson Valley Powder Farm. Electromagnetic and magnetic data showed some zones of concentrated anomalies, while there was a general scattering of small anomalies throughout the site. Data showed the debris approximately 1- to 2-meters below the surface. The U.S. Army Corps performed actions to further investigate and remove the metallic wastes.

The Federal Facilities Section has been an integral part of the planning and review process for the Bench Scale Pilot Study. The section, along with EPA Region VII, the Missouri Department of Health and Senior Services and Washington University are in the process of reviewing and commenting on the Final Phase IV Remedial Investigation. The investigation, through the human health risk assessment, has identified AOC 2 and the down gradient plume to be a risk to human health and the environment. The Bench Scale Pilot Study is a study to determine a possible remedy for the down gradient plume and will be evaluated in the upcoming Feasibility Study. The Federal Facilities Section has reviewed, commented and observed in the field the Baseline Geophysical Work Plan, Bench Scale Work Plan and the Quality Assurance Project Plan associated with the Bench Scale Pilot Study. Results from the study will be available in December or January for review.

Department Receives Funding for Abandoned Gas Station Cleanups

The Department of Natural Resources recently was awarded funding to address some abandoned gas station cleanups. In Missouri, the department investigates and, when needed, cleans up tank sites for which a responsible party does not exist or cannot be found. Because funds are not available to address all such sites, the sites are prioritized based on the real or potential threat each poses to human health and the environment. High priority sites are first to be funded. Sites of a medium or low priority may sit idle for years before funding is available to allow for appropriate investigation, remediation and tank closure.

The department has identified several former gas station sites for which a responsible party does not exist. At these sites, additional actions by the department are necessary to reduce unacceptable human health and environmental risks posed by petroleum underground storage tanks on the sites. This project would fund work by the department through private contractors to reduce risks associated with these sites.

A $242,000 proposal was submitted. The original proposal was to address two groups of underground storage tanks. The first was to conduct source removal activities at several sites and the second was to conduct site characterization and risk assessment activities at several sites that had source removal previously conducted. EPA informed Missouri the second list of sites for site characterization and risk assessment activities was accepted. This was for an amount of $43,000.

Application of funding to these projects will result in additional cleanups the department might not otherwise be able to address due to funding limitations. The project will continue at other abandoned sites until all funds are spent. This project will be conducted in state fiscal years 2012 and 2013.

Department Received Funding for Assessment and Cleanup Activities for Historic Route 66

The Environmental Protection Agency and the Department of Natural Resources are partnering in a Historic Highways Revitalization project. EPA has conducted an inventory of all abandoned tank sites along the former Route 66 corridor. This was followed by a prioritization of the list of sites and communities most likely to benefit from redevelopment and reuse of these abandoned sites. EPA and the department will then look to partner with these communities, historic societies, non-profit organizations and other groups on projects to revitalize these areas.

The department would like to work with communities along Historic Route 66 to provide assessments of abandoned gasoline stations for petroleum contamination. This would consist of Phase I and Phase II environmental assessments.

A $288,000 proposal was submitted. EPA informed Missouri the concept of the proposal was accepted, however, at a reduced amount of $94,000. This amount was derived by the proposals average cost numbers for Phase II assessments ($11,000 per) and the average cost numbers for Risk Assessment or Source Removal ($25,000 per) and so $94,000 was awarded for approximately four assessments and two risk assessment/source removal projects.

Route 66 was constructed in the 1920s to take motorists from Chicago to Los Angeles. For more

than four decades, Route 66 operated as one of the country's main arteries of transportation across the United States. This highway entered Missouri over the "Chain of Rocks Bridge" north of St. Louis and entered Kansas in the Galena area. This highway was decommissioned in the 1970s with the building of Interstate 44, which follows much of the path of the former Route 66.

Many services, such as gas stations, restaurants, motels and drive-in theatres, were constructed along Route 66. As the interstate took the place of the original highway, many of these businesses closed and became abandoned. Many of the abandoned underground storage tanks were never properly addressed and many may have leaked gasoline into the soil and groundwater leaving a legacy of contamination that may pose a current or future risk to human health or the environment. This discourages redevelopment and reuse of these properties.

Partnering with cities and other organizations will allow the department to target sites that have redevelopment plans or ideas in mind for reuse of these properties. Some of these targeted sites will be redeveloped immediately. Other sites may be redeveloped over time as the stigma of potential contamination may be removed and allow redevelopment in the future.

A former gas station – just west of Springfield – located along Route 66.

A former gas station – just outside of Avilla – located along Route 66.

Petroleum Storage Tanks Regulation September 2011

Staff Productivity	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	TOTAL
Documents received for review	189	194	153	0	0	0	0	0	0	0	0	0	536
Remediation documents processed	137	159	171	0	0	0	0	0	0	0	0	0	467
Closure reports processed	14	8	11	0	0	0	0	0	0	0	0	0	33
Closure notices approved	9	6	2	0	0	0	0	0	0	0	0	0	17
Tank installation notices received	10	5	5	0	0	0	0	0	0	0	0	0	20
New site registrations	3	1	2	0	0	0	0	0	0	0	0	0	6
Facility Data													
Total active and closed USTs	40,222	40,236	40,261	0	0	0	0	0	0	0	0	0	
Total permanently closed USTs	30,808	30,839	30,878	0	0	0	0	0	0	0	0	0	
USTs active and temporarily closed	9,412	9,395	9,395	0	0	0	0	0	0	0	0	0	
USTs in temporary closure	870	853	834	0	0	0	0	0	0	0	0	0	
Total hazardous substance USTs	395	395	395	0	0	0	0	0	0	0	0	0	
Facilities with active USTs	3,578	3,568	3,569	0	0	0	0	0	0	0	0	0	

Closures

Underground Storage Tanks	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	TOTAL	All Yrs
Closure Reports Reviewed	14	8	11	0	0	0	0	0	0	0	0	0	33	
Closure Notices Approved	9	6	2	0	0	0	0	0	0	0	0	0	17	
Number of Tanks Closed (Closure NFA)	13	32	29	0	0	0	0	0	0	0	0	0	74	

Cleanup

Underground Storage Tanks	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	TOTAL	All Yrs
UST release files opened this month	2	2	3	0	0	0	0	0	0	0	0	0	7	6,268
UST cleanups completed this month	4	15	21	0	0	0	0	0	0	0	0	0	40	5,434
Ongoing UST cleanups	864	851	834	0	0	0	0	0	0	0	0	0		
Aboveground Storage Tanks														
AST release files opened this month	0	1	0	0	0	0	0	0	0	0	0	0	1	414
AST cleanups completed this month	1	0	6	0	0	0	0	0	0	0	0	0	7	250
Ongoing AST cleanups	168	170	164	0	0	0	0	0	0	0	0	0		
Both UST and AST														
Total release files-both UST & AST	0	0	0	0	0	0	0	0	0	0	0	0	0	74
Cleanups completed-both UST & AST	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Ongoing cleanups-both UST & AST	31	31	31	0	0	0	0	0	0	0	0	0		
Unknown Source														
Total release files-unknown source	3	6	3	0	0	0	0	0	0	0	0	0	12	310
Cleanups completed-unknown source	1	2	1	0	0	0	0	0	0	0	0	0	4	197
Ongoing cleanups-unknown source	110	113	113	0	0	0	0	0	0	0	0	0		
Documents Processed	137	159	171	0	0	0	0	0	0	0	0	0	467	
***Reopened Remediation Cases**	0	0	0	0	0	0	0	0	0	0	0	0	0	78

Effective December 2008 tanks with unknown substance will be included in total figures. Some measures are re-calculated each month for all previous months to reflect items added or edited after the end of the previous reporting period.